GLEN CANYON PROJECT

by

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Forty-two years ago the 85th Congress passed enabling legislation to initiate construction of four dams in the Upper Colorado River Basin. The projects were Glen Canyon in Utah and Arizona, Flaming Gorge in Utah and Wyoming, Navajo in New Mexico, and Curecanti in Colorado. The focus of this paper is on the Glen Canyon reservoir, a project of the Bureau of Reclamation. Following the completion of the Glen Canyon dam in March, l963, the impounded waters of the Colorado River formed a huge body of water, Lake Powell, l83 miles long, having a surface area of 250 square miles, and 2000 miles of tributary canyons. Lake Powell in the late l960s became a recreation mecca for as many as 2,000,000 persons annually. Lake Powell is part of and surrounded by the Glen Canyon National Recreation Area and a mix of federal, state, and Indian lands.

Once the Glen Canyon reservoir was authorized, the National Park Service, acting for the Bureau of Reclamation under the mandates of the Antiquities Act of l906 and Historic Sites Act of l935, set into motion procedures to let contracts for the cultural and natural resources endangered by the ensuing construction and flooding events. This program had the official title, the Upper Colorado River Basin Archeological Salvage Program, which was soon abbreviated to the Glen Canyon Project.

The master stream of the Glen Canyon Basin is the Colorado River, and its main tributary is the San Juan River. Through the eons of time the rivers and streams have cut down through many layers of hard and soft sedimentary rocks notably the Navajo, Kayenta, and Wingate

formations which mostly form the inner and outer gorges of the main and tributary canyons. Today the Glen Canyon Basin is part of the spectacular Canyonlands Country.

Before Lake Powell, the area was a magnificent display of elevations; platforms, buttes, and mesas rising above deeply cut canyons of heights upward to 1000 ft. Uniting the upland structures with the main canyons were massive areas of undulating bare or sparsely vegetated rock slopes, called baldrock or slickrock. Generally, away from the rivers and perennial streams below 6000 ft., the vegetation is sparse and desert-like, while the uplands are vegetated with pinyon and juniper forests and sagebrush parks. Within the canyon system, some streambeds are dry with intermittent stream flows, while others have the lushness of watered gardens, reflecting pools, and often are teaming with small forms of wildlife. The weather for the Glen Canyon area has extremes ranging from very hot summers with violent thunderstorms in July and August to cold winters including freezing conditions and snow even at 3300 ft. in river environs.

Today, the historic human occupation of this canyon country is sparse. Native Americans reside mostly in the uplands on the southern sides of the Colorado and San Juan rivers. Euro-American cattle ranchers and prospectors and occasional farmers occupy state, federal, and private lands in Utah north of the Colorado and San Juan rivers.

Administrative Matters

In 1956, the Bureau of Reclamation and The National Park Service, facing the need for a massive multidisciplinary cultural and natural data recovery program, selected the Museum of Northern Arizona (Museum) for geological and archaeological studies, and the University of Utah (Utah) for biological, historical and counterpart archaeological studies. Both institutions set up their respective research programs as separate entities. Under their respective directorships, the

Museum and University assembled research staffs and developed facilities to house their respective project activities and collections. Each had its own laboratories, collections processing and storage protocols. Equipment procurement, logistical procedures, conduct of field research were usually the province of the field directors and crew chiefs.

Each institution negotiated its own memoranda of agreements with the National Park Service from l956 to l963. During this period a spirit of cooperation existed among all the research groups with free exchange of general information, site records, photographs, site location maps, site records, photographs and occasionally transportation to study areas. Individual researchers often provided cross-discipline technical information and specimen identifications to other project personnel. The University of Utah research findings were published in the University of Utah - Anthropological Papers - Glen Canyon Series. The Museum of Northern Arizona published its reports in the Museums Bulletin and Technical Papers and in the Plateau quarterly journal. (Note See Jesse D. Jennings 1966 for an almost complete listing of GCP publications and reports through 1966). Funding for the project was supplied by the Bureau of Reclamation to the National Park Service, and this agency contracted with the Museum and University for the period 1958 to 1963.

Field Work

During the first months of the project the Museums contract sponsored two surveys by two avocational archaeologists in Navajo Canyon and in Glen Canyon Proper. In l956, the Museum conducted the first Glen Canyon Project excavation for the Arizona Highway Department at the Heltagito site near Page, Arizona.

In l957, the University of Utah had an archaeological survey party exploring the west bank of the Colorado River and the adjoining uplands and an excavation party on the Escalante River uplands. An archaeological survey of the San Juan inner gorge was begun in September, l957 and finished in l958. By the summer of l958, the respective disciplines - archaeology, biology, geology and history had been fully staffed and were conducting intensive field research activities, working under several memoranda of agreements with the National Park Service. The following is a brief survey of the activities and accomplishments of these disciplines.

Biology

Angus Woodbury, long association with the Glen Canyon, recruited biologists at the University of Utah, Division of Biological Sciences and from other institutions for the well-rounded biological team. Most of the biologists were senior faculty members and seasoned field workers. The biologists objective was to determine ...what biological resources were available to the ancient people... of the Glen Canyon region (Woodbury l958). Their scope of work later expanded to study the limnology of the Colorado River and its tributaries and develop an inventory of the flora and fauna to determine the kinds and quantities of plants and animals that would eventually be imperiled by inundation. Over the term of the project, the University biologists and numerous other affiliates and colleagues produced reports on vegetation, mammals, rodents, birds, amphibians and reptiles, fishes, algae, aquatic insects, endoparasites and terrestrial insects of the Glen Canyon basin. Many of the reports addressed issues of timely interdisciplinary interest to the archeologist, geologist and historian.

Geology

Maurice E. Cooley, hydrologist with the U. S. Geological Survey, was the geology program director and based at the Museum of Northern Arizona. Beginning mid-l957, Cooley

began measuring rock sections throughout the Glen Canyon River basin, traveling both overland and by river. Cooley and his assistants took numerous spring and streamflow measurements and studied the ancient gravel deposits running along the rims of the Colorado and San Juan rivers. In May, 1958, Cooley prepared an inhouse geology primer Physiography of Glen and San Juan Canyons, Utah and Arizona for the Glen Canyon investigators, which proved most useful to the field parties of all the disciplines. Cooley later published some of his investigations in the Museums Bulletin and Technical Series and geology field guidebooks. Cooley returned to the Geological Survey prior to the conclusion of the project, where he and his Survey colleagues published the Glen Canyon geology data (Cooley and others l969).

History

C. Gregory Crampton, Professor of History at University of Utah, on learning of the project, requested the National Park Service to consider the rich historical heritage of the region as a subject worthy of study. Cramptons inquiry was accepted and history was made a part of the Universitys investigation team. Crampton, with his colleagues, and students, made numerous auto and river trips in the basin to observe, photograph, and record historic sites and features. They also collected case histories and documents pertaining to the three hundred year history of the area and published these historical studies in the Universitys Anthropological Papers series, and others in professional journals.

The historical studies traced l8th, l9th, and 20th century visitors to the Glen Canyon area and the mid-20th century events of water politics in the western United States. His field research for primary data demonstrated the huge impacts that human prospecting for mineral resources had on the canyon country. Cramptons work made the Glen Canyon basin one of the best historically studied regions in the western United States. His book on the canyonlands, Standing Up Country,

published in l964, is a testimony to his ability to communicate the excitement and beauty of the canyon country to the general reader.

Anthropology/Archaeology

Archaeology was the largest commitment of the Glen Canyon Project. In l956-57 the archaeological paradigm was cultural history with chronology building an important theme. Both the University and the Museum set out to do archaeological investigations in the realm of anthropological research with a bent to human ecology.

Areas of responsibility for the archaeological program were allocated by the National Park Service (MAP): to the Museum the south and extended east bank of the Colorado River including Cummings Mesa below the San Juan River and all the San Juan River and the southern extended bank including the southern tributaries, Paiute Mesa and the Rainbow Plateau off the slopes of Navajo Mountain. The University assumed responsibility for the remainder of the basin; the mainstream river area in Utah, the Kaiparowitz Plateau, other uplands north to the towns of Escalante and Boulder and southward to Hite on the Colorado River and the San Juan Triangle area.

Formal coordination of the Museum and University research programs was not required by their contracts, but there were frequent communications between the research institutions. Each institution wrote its own research design and priorities. Staffing of the two programs was similar, each institution had its own directorship, Jesse D. Jennings at Utah and Harold S. Colton and Edward B. Danson at the Museum. Assistant directors, and crew chiefs, who were usually graduate students trained in anthropology and specializing in archaeology, and crew members ranged from students and avocationalists, to summer job workers. The Museum employed 26 Navajos, many of whom became skilled excavators and laboratory technicians.

The Glen Canyon basin was a formidable area in which to conduct field investigations. Transportation of staff and supplies was done by a mix of trucks, power and float boats, horses and foot travel. Much of the field equipment used was World War II military surplus. Lines of communication were difficult to maintain and supply points far between. Logistics were always complicated and costly of time, energy and dollars. Field camps were usually temporary, established as the circumstance required and lasting for a day, several days and even months. Artifacts and ecofacts were processed, sorted, cleaned and catalogued both in the field and homebase laboratories in Salt Lake City and Flagstaff, respectively. Analyses almost always took place in the permanent homebase laboratories. Report writing on the various field investigations and laboratory analyses began in l957 and continued intensely through 1963.

Accomplishments

The Glen Canyon Project archaeological programs ran for six funded years, ending with the Park Service termination of the project in the Summer of 1963. However, project personnel continued to carry out research on various studies of their choosing into the l970s. Each institution benefited greatly from this endeavor and many of the project employees went on to professional careers in anthropology. Thirty-six doctoral dissertations and l2 masters theses were written on various aspects of earlier investigations, including graduate degrees earned in biology and history. Publications in anthropology and archaeology numbered over l50 titles appearing mostly as monographs and journal articles (Don D. Fowler, personal communication).

The accomplishments of the archaeological program go beyond these simple statistics, as is so well presented in Jesse D. Jennings classic Glen Canyon: A Summary, which was a project funded report prepared for the general public, a first of its kind.

To finish this paper, I present a few of the many contributions and accomplishments of the Glen Canyon Project archaeological program.

The two institutions recorded over 2000 sites and excavated and tested about ten percent of the survey locations. Collections from the field have provided a huge body of data for education, research and public museum exhibition.

The many personnel on the project gained valuable experience and mental conditioning to be used in professional careers, to train a new generation of reseachers and teachers, and to establish public and contract programs in archaeology. Several of the Glen Canyon Project archaeologists became active participants in the conversion of salvage archaeology into cultural resource management, and the emergence of conservation archaeology.

It is important to note again the synthesis report on the Glen Canyon Project (Jennings 1966) which served as a milestone for other projects to be funded in the future by the Bureau of Reclamation.

Project archaeologists made an attempt to look for and examine the full spectrum of human occupation in the Glen Canyon basin. Serious efforts were made to examine the Pleistocene gravel and deep alluvial deposits in the Glen and San Juan canyons for PaleoIndian artifacts, but no clear-cut evidence was found for this period.

Archaic period deposits were present in the basin, usually occurring on the ground surface as lithic workshop debris and milling stones. The most definitive evidence came from excavated deposits in two caves on the Rainbow Plateau northeast of Navajo Mountain in Utah. A decade after the project ended, archaeologists, using new analytical techniques on artifacts and dating tools, demonstrated a strong presence of Archaic throughout the basin.

Evidence for the transition of Archaic hunter-gatherers to horticulturalists (also named Basketmaker II) growing maize was sparsely represented throughout the basin, except in the Triangle area, mostly in shelter and cave sites. Collections from excavated sites demonstrated this new lifestyle was directed toward a more sedentary condition.

The presence of the Early Formative (Basketmaker III and Pueblo I) occupation in the basin was sparse, mostly found in the areas worked by the University. Early Formative sites and areas of occupation were known south of the Museum area, but these were outside of the authorized work area. The Late Formative period (Pueblo II and III), project data made possible the delineation of prehistoric cultural boundaries and an understanding of the cultural interactions at boundary edges for the Kayenta, Mesa Verde, Fremont and Virgin traditions. Foot communication trails were recognized and explored adding special insight into the routes of human interaction during the time between A.D. 1000 and 1300.

We gained a better understanding of the various settlement patterns of the residents of the uplands and how the l2th and l3th century inhabitants of the uplands utilized the canyon environs and adjoining upland areas north and east of the Colorado River and north and south of the San Juan River.

At the end of the project definitive statements could be made about puebloan (Anasazi) architectural building layouts, the internal organization of buildings, specific architectural details, and societal models for late l3th century Kayenta household and village organization. Anasazi population movements during the l3th century and new village structures showing aggregation were clearly demonstrated with the new information. The westward expansion of the Mesa Verde tradition into the Triangle area was investigated with major findings including new data and insights into the interactions of the Mesa Verde and Kayenta settlers. The resultant effects of

outmigration-abandonment from the Triangle and Kayenta regions in the late 1200s became clearer than previously known. The abundant information would contribute in the 1980s to ideas formulated on major population shifts in the puebloan area at the close of the 13th-century.

Unique water control features, reservoirs, stone-lined ditches, aqueducts, for irrigation of puebloan fields in the canyons came to light for a better understanding of the horticultural techniques used by the Anasazi in the A.D. ll00s and l200s.

A classic study was made of the rock art in Glen Canyon determining great time depth (Archaic to Modern) for the several temporal styles of petroglyphs found throughout the basin.

Analyses of human osteological collections and specimens of fecal material gave the archaeologist an understanding of the effects of stress and diet on the human inhabitants of the basin. It appeared that many of the individuals in the various populations had a difficult and often short life span.

The archaeological investigations of the Glen Canyon Project were part of a multidisciplinary study, including biology, geology and history. These four disciplines provided an abundant data base for in-depth views of the natural and cultural dynamics of the basin and how these systems within the basin related to those present in areas around the basin.

The estimated cost of the Glen Canyon Project for the four disciplines over a period of six years was about $1,000,000.

Epilogue

After 1963, Lake Powell provided a water source that made possible the construction of coal-fired power plants, a coal mine, and railroad and pipeline transportation facilities in and adjoining the Glen Canyon basin. These major projects and many other smaller ones, like roads,

powerlines, and well pads, followed in the late 1960s and later. These projects required assessment surveys and excavations involving hundreds of sites of similar time periods and cultures found earlier during the Glen Canyon Project investigations. In addition to these projects, there were others, usually supported by grants, adding to the pool of information for the greater Glen Canyon region. The new data coupled with new theoretical orientations has put the Glen Canyon Project into a new perspective. In a sense, the project lives on and this is exemplified by the recent publication - Glen Canyon Revisited (Geib 1996).

Acknowledgments

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MAP AND PHOTO ILLUSTRATIONS SUGGESTED FOR USE IN THIS REPORT

MAP In Jesse D. Jennings 1966, page 3, Figure 2. Work areas assigned to the University and Museum.

PHOTO In Adams, Lindsay and Turner 1961, page 2, Figure 2. The Colorado River and its inner and outer gorges, gravel terraces. baldrock slopes, and sandbars.